National Quail Symposium Proceedings

Volume 1 Article 12

1972

Managing Bobwhites in the Cutover Pinelands of South Florida

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MANAGING BOBWHITES IN THE CUTOVER PINELANDS OF SOUTH FLORIDA

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Abstract:

Because the principles governing production of quail are similar throughout its range, only problems and techniques unique to the flatwoods of southwest Florida are discussed. A description of these pinelands includes geology and soils, climate and key plant communities. The Florida bobwhite and its foods and other needs are discussed briefly. A major portion of the text is concerned with the effects of primary land uses on quail habitat, and management modifications to improve quail production.

The bobwhite quail (Colinus virginianus L.) is unquestionably the most popular game species in the pinelands of the southeastern United States. As a result of research begun some 50 years ago, management techniques are probably more highly developed for this bird than for any other species--we know how to manage for sustained, huntable populations. Although problems and techniques of management discussed in this paper relate specifically to the flatwoods region of southwest Florida, the principles for increasing quail are similar throughout this bird's range.

The Flatwoods

Topographically, flatwoods are relatively flat, low pinelands of imperfectly to poorly drained acid soils. They are young soils of marine origin atop relatively impervious deposits of marl, limestone, and calcareous sandstones (1).

The climate is subtropical--more maritime than continental. The weather is characterized by mild year-round temperatures and marked by seasonal differences in rainfall. For example, nearly 0.75 of the annual precipitation of 53 inches in the Fort Myers area falls between May 15 and October 15. When the rainy season ends, moisture is lost rapidly, primarily through evapotranspiration. A dry winter culminates with a distinct and often severe drought in April and early May.

Ecologically, the flatwoods are characterized by open stands of longleaf pine (Pinus palustris Mill.) and south Florida slash pine (Pinus elliottii var. densa Little & Dorman) growing in association with saw-palmetto (Serenoa repens (Bartr.) Small) and pineland threeawn (Aristida stricta Michx.). A high summer rainfall coupled with very slight differences in local elevation and poor drainage, has caused the development of numerous small wet prairies and freshwater marshes as well as several other minor plant communities (1).

The pine-palmetto community covers about 75% of the land area. Saw-palmetto covers 20% or more of the area. A number of other shrubs occur--most are evergreen. Pineland threeawn the common "wiregrass," is the

dominant herb but numerous other grasses, grasslikes, and forbs are found. Legumes are scarce.

Wet prairies are short-grass meadows in a seasonally flooded ecotone between the pinelands and freshwater marshes, and are locally called "sloughs." They frequently form drainageways connecting freshwater marshes and typically occupy 10-15% of the area. Common species are pineland threeawn, panicums (Panicum spp.), beakrushes (Rhynchospora spp.), and razorsedges (Scleria spp.).

Freshwater marshes, or "ponds" as they are locally called, occupy an additional 10-15% of the area. These treeless hydric communities are dispersed along natural drainageways (sloughs). Most are somewhat circular depressions often with centers of pickerelweed (Pontederia lanceolata Nutt.), arrowhead (Sagittaria lancifolia L.), fire flag (Thalia geniculata L.), or sawgrass (Mariscus jamaicensis (Crantz) Britton). Water usually stands in the deeper centers year-round, but many shallow "sand" ponds dry up during the spring. Freshwater marshes are of little value to quail except during the dry spring when green vegetation is available.

The Florida Bobwhite

The Florida bobwhite quail (Colinus virginianus floridanus Coues) is slightly smaller and darker than the typical eastern bobwhite (C. v. virginianus L.). The Florida subspecies averages about 5 oz (12) as compared with 6 oz for the eastern subspecies.

The Florida bobwhite occurs throughout southern Florida and northward about 0.75 up the peninsula. To the north there is considerable overlap with the eastern subspecies (12).

Frye (2) noted that breeding activity starts early in south Florida with some pairing off as soon as February; breeding may extend into October. Nesting usually peaks in May and June but will vary depending upon weather.

Frye (2) found reproductive success to be inversely related to summer rainfall. As noted previously, summer is the rainy season in south Florida and a dry summer rarely occurs. Rainfall will average about 8.5 inches per month during this period. Sudden downpours are common.

Fall populations in Charlotte County ranged from 1 bird per 63 acres to 1 bird to nearly 6 acres over a 7-year period, an average of 1 bird per 23 acres (2).

Because the vegetation of the flatwoods is quite different from that occurring elsewhere in the bobwhite range, foods available and taken by quail can also be expected to be different. Laessle and Frye (8) found that annual razorsedge (Scleria muhlenbergii Steud.), commonly called "sloughgrass," constituted about 27% of the diet. Achenes of sloughgrass and the fruits of dwarf waxmyrtle (Myrica pusilla Raf.) together were more than 40% of the total diet on the Webb Wildlife Management Area.

Puffball fungus and green plant material are also important items during the winter. Insects and seeds of many weeds and grasses make up the summer diet. Various masts and fruits are utilized during late summer and fall as available.

For all practical purposes, food and cover are the habitat essentials subject to management. On most quail ranges in the South, winter foods and nesting cover give managers the most trouble (2, 13, 15). These seem to be the primary problems in south Florida as well.

Management

Since Ponce de Leon brought the first cattle to this country in 1521, the pinelands of south Florida have been extensively grazed and for years a low level of range management was practiced. The woods were burned as frequently as possible to control shrubs, remove the herbaceous "rough," and "freshen" forage (14). During the 1940's the pinelands were heavily cut over, and shallow canals connecting ponds and sloughs were dug to enhance surface drainage.

Although most grazing still depends on native range, improved pastures are rapidly increasing in importance, but intensive forestry is not yet a widespread practice. Other agricultural enterprises such as citrus and vegetable production have invaded the region and are on the increase. Extensive urbanization has accompanied phenomenal human population increases during recent years and is expected to continue.

Extensive forestry and ranching operations over much of the present quail range stand to be overwhelmed by intensive agriculture, land speculation, and urbanization. These latter uses drastically alter the land's natural features, and quail habitat is degraded or destroyed. Managers in the future will face the increasing difficulties of integrating habitat essentials within landscapes managed primarily for other uses.

Cattle Ranges

Grazing

Range specialists recommend rotational grazing to increase efficiency of forage use and to improve vigor of important range plants (6); however, continuous year-long grazing is still commonly practiced. Cattlemen normally burn the range in alternate years and subsequently practice rotational grazing whether planned or not. Cattle utilize freshly burned range while 1-year-old roughs receive comparatively light use. According to Frye (2), this rotational burning-grazing system improves quail habitat.

Wiregrass, the principal herbaceous cover, quickly becomes impenetrable roughs for quail if not constantly kept open. Frye (2) noticed that moderately heavy grazing reduces this mechanical barrier by breaking up and thinning out ground vegetation. Grazing and trampling tend to be spotty or uneven and create a more diverse ground cover that is preferred by quail.

In many sections of the Southeast, grazing even at moderate levels is considered detrimental because cattle consume important quail food (11, 15, 16). With the exception of sloughgrass and several panic grasses, however, quail food plants are generally not a part of the cattle diet in these pinelands. The occasional heavy use of these species by cattle does not appear to be detrimental. In fact, Frye (2) found thick stands of sloughgrass benefited when moderately grazed. Removal of some plants allowed for greater crown development which resulted in a greater seed crop.

Where grazing is permitted, Stoddard (15) noted that quail tend to select nesting spots protected by briers, pine saplings, or other shrubby growth. Of 2 dozen or so nests observed locally over the last few years, all were located under the protective canopy of shrubby growth, usually saw-palmetto or dwarf waxmyrtle. In view of this, nesting-cover management on cattle ranges should include small clumps of low shrubs.

Quail habitat benefits when rotational grazing programs properly combine improved pasture with native range. When fall-burned native range is grazed throughout the winter and spring, perennial vegetation is thinned out. Then, while cattle graze improved pasture during the summer and fall, food-producing annuals will develop and nesting activity can proceed unmolested.

A major concern, however, is the tendency of landowners to establish large, rectangular improved pastures completely cleared of saw-palmetto and other brushy cover. They are typically planted to improved grasses such as bahiagrass (Paspalum notatum Flugge) or pangolagrass (Digitaria decumbens Stent.) and then closely grazed. These pastures are of little benefit to quail.

When quail management is a consideration, pastures should be small and narrow, containing a few mast-producing trees as well as scattered brushy cover (15). Frye (2) recommends strips of pasture 50 to 100 yards wide alternating with similar widths of natural vegetation. Clumps of saw-palmetto or islands of other undisturbed shrubby vegetation scattered throughout these strips provide additional refuge and protective nesting cover. Stoddard (15) suggested that such a pasture configuration might greatly benefit quail when placed in extensive roughs difficult to maintain by burning or grazing and in young pine plantations where fire is temporarily excluded.

Burning

The flatwoods consist of fire-dependent communities of highly flammable species. Burning, therefore, has only a temporary effect. Fire consumes dead plant material and thins out the perennial fire subclimax vegetation by reducing plant size. Annual plants are stimulated the first year. The resulting vegetation is open and in good condition for quail to feed. One fire-free year is normally required for a burn to fully recover.

Frye (2) found sloughgrass production greatly improved on winter-burned areas as compared with similar adjacent unburned sites. My

trials underway near Fort Myers are providing substantiating information. Although burning 2-year roughs and applications of rock phosphate did not increase plant numbers, increases in plant size resulted in improved production of sloughgrass achenes as compared with 2-year-old roughs. Burning alone produced twice as many achenes (2.5 lb/acre) and the addition of rock phosphate (1 ton/acre) 7 times as many (7.3 lb/acre).

Frye (2) found time of burning important. Burning in the fall and early winter while the soil was still moist and the vegetation green provided spotty, incomplete burns creating diversity and "edge." Early burning also favored sloughgrass production, but spring burning consumed many seeds of value to quail. Burning after February becomes hazardous and difficult to control. Hot sweeping fires result when both soil and vegetation are dry. Large areas may be completely cleaned and rendered temporarily unusable. Moist areas subject to flooding may be the only places to escape burning, and quail are attracted there to nest (15).

Frye (2) concluded that early burning appeared beneficial to cattle by producing several months of slow-growing, tender forage while spring burns produced rapid growth that tended to "get ahead" of the cows and become tough and unpalatable quickly. However, as reported by Hilmon and Hughes (5) some ranges are burned progressively from October through the winter to as late as May to extend the period when nutritious forage is available for cattle. Ranges burned in March or May produce 2 to 4 times as much herbage in the 60 days after fire as ranges burned in October or November (9). In a well-managed cow and calf operation, therefore, the breeding season is planned to provide calves that are large enough to consume the considerable quantities of herbage when forage quality is highest in the spring and summer (7).

In summary, fall and winter burning appears to be compatible with optimum production of quail on ranges grazed yearlong by cattle. About 0.33 to 0.5 of the range should be burned each year, but burning should not be done after nesting begins in March.

Discing

Discing is widely used by game managers to control unwanted perennials and to stimulate seed-producing annuals. In south Florida, discing more or less destroys the dominant wiregrass cover. Sloughgrass and other annuals respond vigorously the first year (2) but are rapidly replaced by bluestems (Andropogon spp.), panicums, goobergrass (Amphicarpum muhlenbergianum (Schult.) Hitchc.), and other species, most of which are palatable to cattle.

In my study near Fort Myers, discing failed to benefit sloughgrass plant numbers but did increase plant size and seed crop of sloughgrass. Discing 2-year-old roughs produced 6 times as many seeds (6.2 lb/acre) while the addition of fertilizer to disced strips increased the yield 40 times over that on 2-year-old roughs (41.4 lb/acre). On these sites, however, cattle concentrate, overgraze, and destroy most of the vegetation beneficial to quail. Moreover, when rock phosphate is added, the vegetation is so closely grazed it provides low-maintenance firebreaks. Consequently, strip discing is not considered practical on

cattle ranges unless protected from grazing.

Seeded strips or food patches have not been successful. Many cultivated legumes and grains have been tried (2) but none survived the poorly drained soils and extreme weather conditions.

Chopping

Chopping refers to a method of controlling unwanted vegetation to improve cattle grazing or to prepare planting sites for pine. Treated areas are "cross-chopped" at right angles with heavy drum choppers. The sod is cut into 1-ft squares resulting in considerable surface soil disturbance, but the sod is not turned as with discing. Saw-palmetto and wiregrass cover is reduced considerably, often as much as 90% (10). However, annuals do not respond as vigorously as when disced, and sites revert more quickly to a perennial vegetation valuable as cattle forage. Treated areas are frequently too large and shrubby cover too sparse for ideal quail habitat.

When chopping is employed as a grazing improvement practice, areas treated should be small to benefit quail. If done in alternating strips as recommended by Frye (2) and Stoddard (15) for improved pastures, it would undoubtedly be most beneficial to quail because this treatment produces a variety of plants, including native panicums and paspalums. Grazing is generally moderate if adequate acreage is provided.

Pine Plantations

Intensive forestry is secondary to grazing in the cutover pinelands. Many ranchers disregard pine production with their burning and grazing programs, consequently much of the area continues to be unstocked with pine. Some landowners, however, are beginning to plant both the typical and the south Florida varieties of slash pine to increase revenues. The typical variety is gaining favor because of better form and superior early growth, but the south Florida variety is more fire resistant and might be best adapted to an integrated program of cattle-quail-timber management.

Traditionally, pines are planted to provide a uniform distribution of trees. The current recommendation of 8 x 10 ft produces maximum shade impact on understory vegetation; consequently such plantations are often referred to as "biological deserts." During much of the rotation they are of little value to quail or cattle.

If timber is to be integrated with cattle and quail production, silvicultural practices must be modified to permit more direct sunlight to reach the plantation floor. Rosene (13) recommends reducing the basal area of fully stocked merchantable stands by at least 30%. A similar reduction in planting density should also be effective.

An alternative might be to alter the planting configuration without drastically affecting stocking. Increasing the planting space between rows to, say, 24 ft and decreasing the within-row space to 4 ft would

allow much more sunlight to reach the understory during the sapling stage while maintaining stockings at recommended levels. Another possibility would be 42 ft between double rows 6 ft apart planted 4 ft apart in rows. These configurations are being tested on cattle range. Another possible alternative is planting pine closely in narrow strips with greater distances between strips.

Feeders

The effectiveness of automatic feeders is a controversial subject. Haugen (4) found feeders to be of little or no value on a study area in Alabama. Frye (3), however, observed an increase from 1 bird per 10 acres to 1 bird in less than 6 acres, and concluded that feeders were useful on areas where food is in short supply, such as on heavily grazed range or near improved pastures. The practice is expensive and probably impractical on public areas. Feeders should be considered a last resort for providing food.

Urbanization

In many respects, urbanization is the most destructive and most intolerable land use so far as game is concerned. There is little hope for integrating huntable populations of quail within urbanized areas. However, recent new ideas in urban planning, such as cluster development, make possible the integration of open spaces containing natural vegetation. The inclusion of wildlife as an aesthetic resource appears promising. In many suburban landscapes, quail already have important aesthetic appeal--where a little open space provides habitat essentials, quail are often attracted to the dooryard with artificial feeders. Rarely do we observe in the wild an entire family group so close at hand.

Summary and Recommendations

Many problems and techniques of quail management in Florida's "semi-aquatic" pinelands are unique. The Florida bobwhite is very sensitive to weather extremes. Both winter food production and nesting activity are affected by severe spring droughts and excessive summer rains. Inadequacy of winter foods and nesting sites appears to be the main problem. Florida's human population is expanding rapidly and the ability to provide habitat essentials is becoming acute as land use intensifies.

The rotational burning-grazing system practiced by cattlemen improves quail habitat. Frequent burning prevents a buildup of old grass. Moderately heavy grazing complements fire by breaking up and thinning out herbaceous vegetation. Recommendations for optimum results follow:

- Burn native ranges on 2- or 3-year cycles.
- Burn during the fall and winter before nesting activity starts in March.
- Graze native range during the winter and spring.

- Rotate cattle to improved pasture during the summer and fall. This relieves native range of grazing pressure while quail food plants develop and birds nest.

- Establish improved pastures and other range improvements in narrow strips, 50 to 100 yards wide, with alternating strips of natural vegetation.

- Leave scattered clumps of saw-palmetto or other natural vegetation for nesting cover.

Discing is effective in south Florida. The native wiregrasses are eliminated and desirable annuals respond vigorously. Discing, however, invites overgrazing and is not practical unless protected from cattle.

- Disc strips during the fall and early winter while the soil is moist.

- Application of rock phosphate will greatly increase response.

Pine plantations stand to degrade quail habitat unless silvicultural practices are modified to permit more direct sunlight to reach the forest floor throughout the rotation. A reduction in stocking is effective, but there are other alternatives.

- Plant more trees in rows to provide greater distances between rows.

- Alternate strips of closely planted pines with strips of natural vegetation.

- Burn and graze pine plantations as early as possible after planting.

Grazing can usually commence after a 1-year deferment. Burning under the south Florida variety of slash pine can usually start at age 4 or 5 years.

Automatic feeders for quail are expensive but useful on cattle range when food is in short supply.

- Feeders should be considered a last resort method of providing food.

Although huntable populations are probably not practical in urban areas, quail can be an important aesthetic resource in suburbs where some open spaces are provided.

- Urban planners should consider cluster development or other designs that provide for an intermingling of natural vegetation with building sites.

With the proper manipulation of burning and grazing, and with modifications in improved pasture and pine plantation design, high populations of quail can be maintained in south Florida. Sustained yields of 1 bird per 5 to 8 acres of rangeland should be practical.

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INSECTS AND BOBWHITE QUAIL BROOD HABITAT MANAGEMENT

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Recipient of the "Wendell Bever" award presented by the Oklahoma Wildlife Federation to the best paper of the Symposium. The award was in memorium to the late Wendell Bever, former Director of the Oklahoma Department of Wildlife Conservation and Regional Representative of the National Wildlife Federation.

Abstract:

Small insects were the most important foods eaten by quail chicks 2 to 20 days of age. The foods eaten, in order of importance, were beetles, leafhoppers, true bugs, spiders, grasshoppers, ants, larvae, snails, and flies. Important seeds ingested were Panicum spp., Carex spp., Scleria spp., Paspalum spp., and Setaria sp.

The effect of fire, a major tool in southern quail management, on insect populations was studied by sampling burned and unburned plots with a sweep net and a D-vac machine. On an old-field type of habitat, population densities and biomass of herbivorous insect populations were significantly greater on February-burned plots than on 5-year-old unburned plots. Two peaks in numbers of insects were found. The first peak of ca. 64,000/acre (sweep net) occurred in mid-June. The second peak occurred in mid-August (D-vac) with a density of ca. 90,000/acre. Total insect biomass, excluding individuals over 0.035 g dry weight, averaged 147 g/acre (sweep net) and 128 g/acre (D-vac).

In the second phase of the study, in a longleaf pine forest habitat, grasshoppers were the only species of insect having significantly greater density and biomass on unburned, 3-year-old "roughs" than on annually burned plots. Lack of litter on annually burned plots probably caused this disparity. At peak density, in the period of mid-July to early August, sweep-net density was 19,500/acre and D-vac density was 58,500/acre. Total insect biomass averaged 79 g/acre (sweep net) and 52 g/acre (D-vac).

The major considerations for brood habitat are abundance and availability of insects. In old-field habitat, fire increases insect abundance and removes accumulated litter, opening the area for ease of chick movement. If the soil is fertile, then annual burns are feasible. The interval of burning advocated is 1 or 2 years, but local problems may